Fibre Amplifiers, the Fiberglass Web and the Optical Moore’s Law

By

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Abstract

Since the 1966 prediction by C. Kao regarding the possibility of achieving optical telecommunications through *silica-glass fibres*, lightwave systems have known about a half-century of explosive growth. Their rapid deployment across continents and oceans, forming altogether a *Fibreglass Web*, made possible the implementation of today’s *Internet*. Yet, such a paradigm would not have been possible without another 1988/1989 discovery: the possibility of in-line optical regeneration though *Er-doped fibre amplifiers* (EDFA), with multi-THz optical bandwidth and practical laser-diode pumping. With rapid progress on wavelength-division multiplexing (WDM) technologies, the *capacity-distance product* (Bit/s/km) impeccably followed a new *Optical Moore’s Law* (OML) steadily exhibiting a tenfold increase every 4 years, over a period of at least 30 years. Alas, the last decade is consistently showing that the OML must be revisited for its self-predicting promises. Within 20 years, if not earlier, should we be possibly witnessing the end of this serendipitous *Era of bandwidth transparency*?

Short Biography

Emmanuel Desurvire (Ph.D, Sc.D, IEEE and Thales Fellow) has been involved in optical communications for over 25 years. He has authored over 200 technical publications, 35 patents, and five reference books on Erbium-Doped Fiber Amplifiers (EDFA), Global Telecommunications, and Classical/Quantum Information Theory. He is currently Scientific Director of Thales R&T, France, after having led for 5 years the Physics Research Department in this group. He has held previous positions at Stanford University, AT&T Bell Laboratories, Columbia University and Alcatel. For his pioneering work on EDFAs, he has received numerous recognitions including the 1998 Benjamin Franklin Medal in Engineering, the 2005 William Streifer Scientific Achievement Award; in 2007, the IEEE/LEOS John Tyndall Award, the France’s National Council of Engineers and Scientists “Engineers of the Year” Award, and the France-Telecom Prize of the National Science Academy. He is also Laureate of the 2008 Millennium Technology Prize, and of the 2011 European Inventor Award.